ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 3.] [1907.

XV.—GINSENG IN COREA.

(*Aralia quinquefolia*, Decne & Planch., VAR. *Ginseng*.)

In *Kew Bulletin* for 1902, p. 4, an account of Ginseng in China was given in which incidental reference was made to Corea as a country supplying the article. The importance of the substance in this latter country, and the care exercised in cultivating the plant which yields it, may be gathered from the subjoined account derived from a paper by the Rev. C. T. Collyer and reprinted from the *Queensland Agricultural Journal* for 1906, pp. 269–271.

In North America, Japan and China, where Ginseng is also cultivated, the crop requires three to four years to reach the stage at which its cultivation becomes profitable; in Corea, it will be observed, the plants are allowed to reach the age of five, six, or seven years before the roots are collected.

"The most esteemed variety of the plant is that grown in Corea. All the Ginseng collected in China is imperial property, and is sold to those who have the privilege of dealing in it at its weight in gold. Of two kinds, the white and the red, the former is most valued, and is accordingly becoming more valuable as its production decreases. The root generally occurs in hard, rather brittle, translucent pieces, about the size of the little finger, and varying in length from 2 to 4 inches. In price it ranges from 24*s*. to 48*s*., up to even £60 per ounce! In preparing a Ginseng garden, or Sam-po, as it is called in Corea, extensive preparations are made. In early winter thousands of loads of a variety of disintegrated granite are heaped up in separate mounds. Then this is covered with a rich mulch made from the leaves of the Chestnut Oak, known to Coreans as the 'Sang.' The leaves are gathered in the spring and summer, pulverised, and sprinkled with water to help decomposition. This mulch is the only fertiliser used. No other fertiliser has been found which is equally efficient.

"As soon as the frost is out of the ground the garden is ploughed up and thoroughly worked over with a spade operated by a gang of four or five men. We have seen this five-man spade

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worked at Mackay in the preparation of the ground for sweet potatoes. The Corean spade is of wood, has an iron shoe or tip, and a handle 8 to 10 feet long, to the butt of which are fastened two straw ropes. The captain, as he may be called, manipulates the handle, while each half of the crew gives its attention to a rope. Then 'with a long pull, a strong pull, and a pull altogether,' an amazingly small quantity of dirt is thrown a distance of 2 feet or so. After the beds have been made high enough to prevent the possibility of water getting to the roots of the plants, they are dug out to the depth of about 6 inches and carefully edged with slabs of slate. Then the dug-out is filled with the artificial leaf soil.

"Sam is propagated from seed. Four-year-old plants will flower in July, but the seed of old plants is preferred. When the seed is gathered it is placed in grass-cloth bags and violently shaken in running water to remove the red husks. The seed, which is cream white, is then scattered on a sunk bed of sand, and a thick covering of sand is spread over the seed and watered every day until November. To shield the young seeds from early frosts, the bed is covered with a lath screen, and a straw thatch is put on at night. On the 26th July the seeds are dug up and sorted, and those seeds which have commenced to germinate are packed with sand in jars and buried in a shady place for the winter. The seed beds are carefully measured, and must face exactly N. N. E. $\frac{3}{4}$ E.

"On every 5½ feet (one *kan*) 62 or 63 rows of germinated seed are sown, and from this time the plants require incessant care. As the weather gets warmer, they are watered twice every twenty-four hours, and the top mat of the sheds erected over the beds is rolled up during the middle of the day. When the rainy season of the summer solstice sets in, a thick covering of thatch is spread over the sheds, while the back and front are enclosed by rush blinds. Rain and dew must not be allowed to fall on the beds. Extreme warmth and extreme cold are unsuited to the nature of the plant. It is not until the 8th November has passed that the grower is able to rest easily. Up to that day he has to be continually on the alert, waging war against insects and weeds. Then, he pulls down the shades, and having put a layer of 7 or 8 inches of soil on the beds, he leaves the garden to the rigours of winter.

"On 21st March of the following year he prepares new beds, and removes the plants to these, placing ten or twelve rows of ten roots each to the 'kan' (5½ feet). These new beds consist of 8 bushels of mulch to 9 bushels of disintegrated granite. The roots now are worth stealing and the garden has to be watched night and day.

"In the following year, after the 21st March, the plants are again moved, and this time the 'kan' contains only eight rows of four roots each. This is intended to be the final planting, but, should the roots not thrive, they are moved to yet another location as soon as possible. Here should be noted a special point in Ginseng culture, one which is held as a close secret. Each time the roots are transplanted they are placed in the ground almost horizontally, slanting slightly downwards. The reasons for not

planting them vertically are: (1) That water may be evenly applied to the whole root; (2) to prevent the roots from dividing and spreading into fine rootlets, sometimes known as 'beard'; and (3) that they may be readily inspected. When the roots are so subject to blight, it is a matter of great importance to be able to inspect them without disturbance. When the plant is five, six, or seven years old, the root is dug up and handed over to the Government. As to the profitableness of sam-growing as an investment, of course, something large would naturally be expected when one has to wait from five to seven years for a return. From the best information—though it can hardly be considered absolutely reliable—a profit of about 60 per cent. is generally made on the original outlay and running expenses.

"During the drying process, the roots will lose two-thirds of their weight. They are first thoroughly washed, and are then brushed with brushes made of human hair. Packed in baskets 2 feet in diameter and 6 inches deep, they are placed in an earthenware steamer. The duration of the steaming is determined by the burning of a torch made of the bark and fibre of the locust-tree. For seven-year-old roots, $4\frac{1}{2}$ inches are burnt; for six-year-old, $3\frac{1}{2}$ inches; and for five-year-old, $2\frac{3}{4}$ inches. The Coreans reckon that this is more reliable than timing by a watch! After steaming, they are exposed to the sun till they stop steaming, and after a little longer exposure are carried to the drying house. The drying-house is rendered perfectly air-tight, and the roots are placed in trays placed on shelves all round the house. Then three large charcoal fires are lighted in holes in the ground. In half a day the sam is taken out, and it then appears red and so hard that it will not yield to the touch. The rootlets are then cut off with scissors. For about ten days the roots are exposed to the sun until they are as hard as stone. In this state they are so brittle that they will break if dropped on the floor, so it would be impossible to pack them without injury. A foreigner would pack them in cotton wool, but not so the Corean. He simply puts the roots in a hamper, which he places on the earthen floor of a damp storeroom. In a short while, the roots soften; they are then removed to a room with heated stone floor, and spread out covered with sheets of oil-paper, being thus left until they are so soft that they will yield to the touch. They can now be easily packed in paper bags and pressed into pinewood boxes without fear of injury. After being packed they again harden, becoming adjusted to the shape of the box."

A previous brief reference to Ginseng in Corea was given in *Kew Bulletin* for 1892, p. 107. An account of Ginseng in America is to be found in *Kew Bulletin* for 1893, pp. 71–74.

The price, £60 per ounce, given in the text as sometimes paid for Ginseng, is so great that it cannot fail to attract particular attention. It may of course be due merely to a typographical error for 60*s.* per ounce. But even if this be assumed, the prices cited call for examination. It is not easy to obtain definite figures in matters of this kind, but the following note, on the trade of Newchwang, contained in the Decennial Report for 1882–91 of the Chinese Imperial Maritime Customs, deserves careful consideration:—"So much has been written about the

enormous sums paid for even a single root of Wild Ginseng that it is believed by many persons to be far more valuable than it really is. During 1891 duty was paid on 1·97 piculs, which was worth on an average Hk. Tls. 80 per catty. Not unfrequently small lots have been passed worth as much as Hk. Tls. 120 per catty, and it has once happened in the course of the last two years that a few roots valued at the rate of Hk. Tls. 250 per catty made their appearance; but Ginseng at this price is more often heard of than seen."

If the Haikwan Tael referred to is taken at about 3*s.*, the catty being equivalent to $1\frac{1}{3}$ lbs. avoirdupois, the prices are therefore usually about 11*s.* 3*d.*, not infrequently as much as about 17*s.*, very rarely as much as 35*s.* per ounce.

The subjoined table exhibits the figures relating to the export of Ginseng from Corea given in Diplomatic and Consular Reports Nos. 3407 and 3660 on the trade of Corea.

Year.	Ginseng.	Quantity.	Value.
		lbs.	£
1903	Red	110,909	110,459
	White	3,446	296
1904	Red	46,851	100,060
	White	1,866	243
1905	Red	107,485	112,351
	White	16,736	664

That the value should be in 1904 twice as great as in the previous and in the following year probably indicates a difficulty as regards supply. Taking the figures for 1903 and 1905 as possibly more nearly normal, we can see that the price per lb. is smaller according to these reports than the price per ounce quoted from Mr. Collyer's note.

Mr. Hurrier and Mr. Perrot (*Bull. des Sci. Pharm.*, vol. xiii.) record the detection by them of the following substances either mixed with or substituted for Ginseng:—Root of *Panax sessiliflorum*, Panch. (Acanthopanax sessiliflorum, *Seem.*); root of *Campanula glauca*, Thunb.; root of *Platycodon grandiflorum*, Benth. and Hook. f.; root of *Adenophora verticillata*, Fisch.; root of *Sophora angustifolia*, Sieb. and Zucc.; root of *Angelica polyclada*, Franch.; root of *Rehmannia chinensis*, Libosch; rhizome of *Apocynum Juventas*, Lour. (Tylophora ovata, *Hook.*); rhizome of a species of *Dioscorea*, identified by them with *D. sativa*, L., so that it is not clear what the actual species employed may be; and finally, rhizome of *Ophiopogon japonicus*, Ker-Gawl.

XVI.—PLANTS FROM LABRADOR.

Sir William MacGregor, K.C.M.G., Governor of Newfoundland, took advantage of the opportunity afforded by an official visit paid in August, 1905, to the Chidley Peninsula to make an extremely interesting collection of the plants met with. The

Chidley Peninsula forms the northern extremity of Labrador and lies between Lat. 60° and 60° 30′ N. A year later Sir William paid a brief visit to Anse Sablon, on the south coast of Labrador, and was then able to make a second small collection.

During these visits the Governor's attention was directed more particularly to an examination of the Moss and Lichen vegetation of Labrador, with reference especially to the possibility of introducing the reindeer to Labrador and of naturalising that animal there, the first step being to ascertain whether food suitable for its sustenance is to be found naturally and in adequate quantity in the country.

In furtherance of this design Sir William enlisted the co-operation of Bishop Martin, of the Moravian Mission, who obtained for him a collection of Mosses and Lichens made in the vicinity of Nain, and of Mr. Hettasch, of the same mission, who collected on his behalf in the neighbourhood of Hopedale.

The various collections were from time to time forwarded to Kew, where the species have been determined by members of the herbarium staff. The collection as a whole possesses considerable general interest, and a consolidated list of the determinations is given below. Having regard to the fact that the primary economic object of the formation of the collection has been to determine whether Labrador can offer a sufficiency of aliment for the reindeer, it has been indicated, in all instances where this is the case, whether the species dealt with occurs also in Lapland and Northern Scandinavia where the reindeer is at home.

In this connection the interest in the collection naturally chiefly centres in the Lichens enumerated in the list. These have throughout the enquiry received Sir William MacGregor's closest attention, and as the collections have been made in the Chidley Peninsula in the extreme north of the country, at Anse Sablon in the most southern tract, and in the vicinity of two distinct intermediate stations, they may with safety be taken as fairly representative of the Lichen flora of Labrador. Owing to the extreme care exercised in drying and packing these Lichens, the species, which consist chiefly of the larger foliose and fruticose species, arrived in excellent condition and in most instances admitted of positive determination. The following general note on this part of the collection has been made by Mr. A. D. Cotton, to whom the examination of the Lichens was entrusted.

"A striking feature of the Labrador Lichens is their similarity "to those of northern Europe. *Platysma nivale*, *Cetraria* "*islandica*, *Bryopogon jubatum* and species of *Stereocaulon* so "abundant in Norway and Sweden, flourish equally well in "Labrador; whilst, just as in Lapland, *Cladonia rangiferina*, the "'Reindeer Moss,' covers vast areas. *Nephroma arcticum*, one of "the most handsome of foliose Lichens, is well represented both "from the northern and southern localities; in Europe it is rare "except in the extreme north, where in common with many "boreal species it extends completely round the arctic circle. "Some tufts labelled 'a mixture as found everywhere on the hills "in dry places' show the character of the Lichen vegetation in

"such regions. The tufts in question consist of equal proportions "of *Cetraria aculeata*, *Cladonia rangiferina*, and *Platysma* "*nivale*. Elsewhere broad patches consisting of one species only "were the prevailing feature."

So far therefore as the Lichens are concerned the reindeer, if introduced into Labrador, would appear to have every prospect of finding an adequate supply of food. Judging from the notes that accompany the specimens, *Cladonia rangiferina*, the main winter sustenance of the reindeer, occurs in great abundance throughout the country, and two other species well known to form part of his food supply are found to be present in the Labrador flora.

A set of these specimens has been returned, after being named, to Sir William MacGregor, by whom they are being placed in the Museum at St. John's, Newfoundland. A set of the Lichens has at the same time been prepared as an exhibit, which may be seen in Kew Museum No. II., Room No. 11.

SPERMAPHYTA.

RANUNCULACEAE.

Ranunculus abortivus, *L.*—Anse Sablon.

Caltha palustris, *L.*—Anse Sablon.

DISTRIBUTION. Lapland, Scandinavia.

Coptis trifolia, *Salisb.*—Anse Sablon.

Actaea rubra, *Bigel.*—Anse Sablon.

PAPAVERACEAE.

Papaver nudicaule, *L.*—Chidley Peninsula.

DISTRIBUTION. Lapland, Scandinavia.

CRUCIFERAE.

Arabis alpina, *L.*—Anse Sablon, Chidley Peninsula.

DISTRIBUTION. Lapland, Scandinavia.

Draba algida, *Adams.*—Chidley Peninsula.

Cochlearia officinalis, *L.*, var. **oblongifolia.**—Chidley Peninsula.

VIOLARIEAE.

Viola blanda, *Willd.*—Anse Sablon.

Viola palustris, *L.*—Anse Sablon.

DISTRIBUTION. Lapland, Scandinavia.

CARYOPHYLLACEAE.

Silene acaulis, *L.*—Anse Sablon, Chidley Peninsula.

DISTRIBUTION. Lapland, Scandinavia.

Lychnis alpina, *L.*—Chidley Peninsula.
DISTRIBUTION. Scandinavia.

Lychnis apetala, *L.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Cerastium alpinum, *L.*—Anse Sablon, Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Stellaria gracilis, *Lange.*—Chidley Peninsula.

Stellaria longipes, *Goldie.*—Anse Sablon, Chidley Peninsula.
DISTRIBUTION. Scandinavia.

Arenaria peploides, *L.*—Anse Sablon, Chidley Peninsula.

LEGUMINOSAE.

Astragalus alpinus, *L.*—Anse Sablon, Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Lathyrus maritimus, (*L.*) *Bigel.*—Anse Sablon.
DISTRIBUTION. Scandinavia.

ROSACEAE.

Rubus arcticus, *L.*—Anse Sablon, Chidley Peninsula.
DISTRIBUTION. Scandinavia.

Rubus Chamaemorus, *L.*—Anse Sablon.
DISTRIBUTION. Scandinavia.

Rubus strigosus, *Michx.*—Anse Sablon.

Rubus triflorus, *Rich.*—Anse Sablon.

Dryas integrifolia, *Vahl.*—Anse Sablon, Chidley Peninsula.

Geum macrophyllum, *Willd.*—Anse Sablon.

Geum rivale, *L.*—Anse Sablon.
DISTRIBUTION. Lapland, Scandinavia.

Fragaria americana, *Britton.*—Anse Sablon.

Fragaria virginiana, *Duchesne.*—Anse Sablon.

Potentilla anserina, *L.*—Anse Sablon.
DISTRIBUTION. Lapland, Scandinavia.

Potentilla emarginata, *Pursh.*—Anse Sablon, Chidley Peninsula.

Potentilla maculata, *Pourr.*—Chidley Peninsula.

Potentilla nana, *Lehm.*—Chidley Peninsula.

Potentilla tridentata, *Ait.*—Anse Sablon.

Saxifragaceae.

Saxifraga Aizoon, *Jacq.*—Anse Sablon.
Distribution. Scandinavia.

Saxifraga aizoides, *L.*—Chidley Peninsula.
Distribution. Lapland, Scandinavia.

Saxifraga caespitosa, *L.*—Chidley Peninsula.
Distribution. Lapland, Scandinavia.

Saxifraga cernua, *L.*—Chidley Peninsula.
Distribution. Lapland, Scandinavia.

Saxifraga nivalis, *L.*—Chidley Peninsula.
Distribution. Lapland, Scandinavia.

Saxifraga nivalis, *L.*, var.—Chidley Peninsula.

Saxifraga rivularis, *L.*—Chidley Peninsula.

Ribes rubrum, *L.*—Anse Sablon.
Distribution. Scandinavia.

Crassulaceae.

Sedum Rhodiola, *DC.*—Anse Sablon, Chidley Peninsula.

Droseraceae.

Drosera rotundifolia, *L.*—Anse Sablon.
Distribution. Lapland, Scandinavia.

Onagrarieae.

Epilobium alpinum, *L.*—Anse Sablon.

Epilobium angustifolium, *L.*—Chidley Peninsula.

Epilobium latifolium, *L.*—Chidley Peninsula.

Umbelliferae.

Archangelica Gmelini, *DC.*—Anse Sablon.

Umbellifera (dub.)—Anse Sablon.

Cornaceae.

Cornus suecica, *L.*—Anse Sablon, Chidley Peninsula.
Distribution. Scandinavia.

CAPRIFOLIACEAE.

Viburnum pauciflorum, *Pylaie.*—Anse Sablon.

Linnaea borealis, *L.*—Anse Sablon.
DISTRIBUTION. Scandinavia.

Lonicera coerulea, *L.*—Anse Sablon.
DISTRIBUTION. Scandinavia.

COMPOSITAE.

Solidago multiradiata, *Ait.*—Chidley Peninsula.

Erigeron uniflorum, *L.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Antennaria alpina, *Gaertn.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Antennaria dioica, *Gaertn.*—Chidley Peninsula.
DISTRIBUTION. Scandinavia.

Achillea Millefolium, *L.*—Anse Sablon.
DISTRIBUTION. Lapland, Scandinavia.

Taraxacum ceratophorum, *DC.*—Anse Sablon, Chidley Peninsula.

CAMPANULACEAE.

Campanula rotundifolia, *L.*, var. **linifolia**.—Chidley Peninsula.

Campanula uniflora, *L.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

VACCINIACEAE.

Vaccinium Oxycoccus, *L.*—Anse Sablon.

Vaccinium pensylvanicum, *Lam.*—Anse Sablon.

Vaccinium pensylvanicum, *Lam.*, var. **angustifolium**, *Gr.*—Anse Sablon.

Vaccinium uliginosum, *L.*—Anse Sablon, Chidley Peninsula.
DISTRIBUTION. Scandinavia.

Vaccinium Vitis-Idaea, *L.*—Anse Sablon.
DISTRIBUTION. Scandinavia.

ERICACEAE.

Arctostaphylos alpina, *Spreng.*—Anse Sablon, Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Andromeda polifolia, *L.*—Anse Sablon.
DISTRIBUTION. Scandinavia.

Kalmia glauca, *Ait.*—Anse Sablon.

Ledum latifolium, *Ait.*—Anse Sablon.

Pyrola rotundifolia, *L.*—Chidley Peninsula.
DISTRIBUTION. Scandinavia.

DIAPENSIACEAE.

Diapensia lapponica, *L.*—Anse Sablon, Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

PLUMBAGINEAE.

Armeria labradorica, *Wallr.*—Chidley Peninsula.

GENTIANACEAE.

Menyanthes trifoliata, *L.*—Anse Sablon.
DISTRIBUTION. Scandinavia.

BORAGINEAE.

Mertensia maritima, *Gray.*—Anse Sablon, Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

SCROPHULARIACEAE.

Veronica alpina, *L.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Veronica serpyllifolia, *L.*—Anse Sablon.
DISTRIBUTION. Lapland, Scandinavia.

Bartsia alpina, *L.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Pedicularis euphrasioides, *Stev.*—Chidley Peninsula.

Pedicularis flammea, *L.*—Anse Sablon, Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Pedicularis groenlandica, *Retz.*—Chidley Peninsula.

Rhinanthus Crista-Galli, *L.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

LENTIBULARIEAE.

Pinguicula vulgaris, *L.*—Anse Sablon.
DISTRIBUTION. Scandinavia.

PLANTAGINEAE.

Plantago borealis, *Lge.*—Anse Sablon.

Polygonaceae.

Polygonum aviculare, *L.*—Chidley Peninsula.
Distribution. Lapland, Scandinavia.

Polygonum viviparum, *L.*—Anse Sablon, Chidley Peninsula.
Distribution. Scandinavia.

Urticaceae.

Urtica gracilis, *Ait.*—Anse Sablon.

Salicineae.

Salix arctica, *R. Br.*—Chidley Peninsula.

Salix sp., cf. **S. arctica**, *R. Br.*—Anse Sablon, Chidley Peninsula.

Salix Cutleri, *Tuck.*—Anse Sablon.

Salix glauca, *L.*—Anse Sablon, Chidley Peninsula.
Distribution. Lapland, Scandinavia.

Salix polaris, *Wahl.*—Chidley Peninsula.
Distribution. Lapland, Scandinavia.

Salix sp., cf. **S. reticulata**, *L.*—Chidley Peninsula.

Empetraceae.

Empetrum nigrum, *L.*—Anse Sablon, Chidley Peninsula.
Distribution. Scandinavia.

Orchideae.

Platanthera hyperborea, *Lindl.*—Anse Sablon.

Irideae.

Iris setosa, *Pall.*—Anse Sablon.

Liliaceae.

Streptopus amplexifolius, (*L.*) *DC.*—Anse Sablon.

Streptopus roseus, *Michx.*—Anse Sablon.

Smilacina stellata, *Desf.*—Anse Sablon.
Distribution. Scandinavia.

Maianthemum canadense, *Desf.*—Anse Sablon.

Clintonia borealis, (*Ait.*) *Raf.*—Anse Sablon.

Juncaceae.

Juncus balticus, *Willd.*—Anse Sablon.
Distribution. Scandinavia.

Luzula hyberborea, *R. Br.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Luzula parviflora, *Desv.*—Anse Sablon.
DISTRIBUTION. Lapland, Scandinavia.

CYPERACEAE.

Eriophorum vaginatum, *L.*—Anse Sablon, Chidley Peninsula.
DISTRIBUTION. Scandinavia.

Carex brunnescens, *Poiret.*—Anse Sablon.

Carex cuspidata, *Wahl.*—Anse Sablon.
DISTRIBUTION. Lapland, Scandinavia.

Carex sp., cf. **C. holostoma**, *Drej.*—Anse Sablon.

Carex maritima, *Müller.*—Anse Sablon.
DISTRIBUTION. Lapland, Scandinavia.

Carex pulla, *Gooden.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Carex stylosa, *C. A. Meyer.*—Chidley Peninsula.

Carex sp., cf. **C. supina**, *Wahl.*—Chidley Peninsula.

GRAMINEAE.

Hierochloa alpina, *R. et Sch.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Calamagrostis sp.—Chidley Peninsula.

Deschampsia flexuosa, *Trin.*—Anse Sablon.

Trisetum subspicatum, *Beauv.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Poa alpina, *L.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Poa annua, *L.*—Anse Sablon.
DISTRIBUTION. Lapland, Scandinavia.

Poa arctica, *R. Br.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Poa caesia, *Smith.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Poa sp., cf. **P. glauca.**—Chidley Peninsula.

Poa glumaris, *Trin.*—Anse Sablon.

Poa pratensis, *L.*—Anse Sablon.
DISTRIBUTION. Scandinavia.

PTERIDOPHYTA.

Filicinae.

Onoclea sensibilis, *L.*—Anse Sablon.

Cystopteris fragilis, *Bernh.*—Chidley Peninsula.
Distribution. Lapland, Scandinavia.

Nephrodium spinulosum, *Desv.*—Anse Sablon.
Distribution. Lapland, Scandinavia.

Equisetinae.

Equisetum arvense, *L.*—Anse Sablon, Chidley Peninsula.
Distribution. Scandinavia.

Equisetum laevigatum, *R. Br.*—Anse Sablon.

Lycopodinae.

Lycopodium annotinum, *L.*—Anse Sablon.
Distribution. Lapland, Scandinavia.

BRYOPHYTA.

Musci.

Andreaea rupestris, *Turn.*—Chidley Peninsula.
Distribution. Scandinavia.

Sphagnum acutifolium, *Ehrh.*—Anse Sablon.
Distribution. Lapland, Scandinavia.

Sphagnum fimbriatum, *Wils.*—Anse Sablon.
Distribution. Scandinavia.

Sphagnum rigidum, *Schimp.*—Chidley Peninsula.
Distribution. Lapland, Scandinavia.

Aulacomnium turgidum, *Schwaegr.*—Chidley Peninsula.
Distribution. Lapland, Scandinavia.

Polytrichum commune, *L.*—Anse Sablon.
Distribution. Lapland, Scandinavia.

Polytrichum juniperinum, *Willd.*—Anse Sablon.
Distribution. Lapland, Scandinavia.

Polytrichum strictum, *Banks.*—Chidley Peninsula.
Distribution. Lapland, Scandinavia.

Bryum bimum, *Schreb.*—Anse Sablon.
Distribution. Scandinavia.

Bryum, sp., cf. **B. Duvalii**, *Voit.*—Chidley Peninsula.

Dicranum elongatum, *Schwaegr.*—Anse Sablon.
DISTRIBUTION. Scandinavia.

Campylopus sp.—Chidley Peninsula.

Paludella squarrosa, *Brid.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Philonotis fontana, *Brid.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Barbula fallax, *Hedw.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Ceratodon purpureus, *Brid.*—Anse Sablon.
DISTRIBUTION. Lapland, Scandinavia.

Rhacamitrium lanuginosum, *Brid.*—Anse Sablon.
DISTRIBUTION. Lapland, Scandinavia.

Camptothecium nitens, *Schimp.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Hypnum aduncum, *Hedw.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Hypnum revolvens, *Sw.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Hypnum stramineum, *Dicks.*—Anse Sablon.
DISTRIBUTION. Lapland, Scandinavia.

Hylocomium splendens, *Bruch et Schpr.*—Chidley Peninsula.
DISTRIBUTION. Scandinavia.

HEPATICAE.

Blepharostoma setiformis, *Lindb.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Ptilidium ciliare, *Nees.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

THALLOPHYTA.

LICHENES.

Cladonia amaurocraea, *Schaer.*—Chidley Peninsula.
DISTRIBUTION. Lapland, Scandinavia.

Cladonia bellidiflora, *Schaer.*—Chidley Peninsula, Anse Sablon.
DISTRIBUTION. Lapland, Scandinavia.

Cladonia cornucopioides, *Fr.*—Anse Sablon.

DISTRIBUTION. Lapland, Scandinavia.

Cladonia cornuta, *Fr.*—Chidley Peninsula.

DISTRIBUTION. Scandinavia.

Cladonia gracilis, *Schaer.*, var. **elongata**, *Fr.*—Anse Sablon.

DISTRIBUTION. Lapland, Scandinavia.

Cladonia rangiferina, *Hoffm.*—Chidley Peninsula, Anse Sablon, Nain, Hopedale.

C. rangiferina, *Hoffm.*, var. **alpestris**, *Schaer.*—Chidley Peninsula, Nain, Hopedale.

C. rangiferina, *Hoffm.*, var. **major**, *Fl.*—Anse Sablon.

DISTRIBUTION. Lapland, Scandinavia.

Cladonia turgida, *Hoffm.*—Anse Sablon.

DISTRIBUTION. Lapland, Scandinavia.

Cladonia uncinalis, *Fr.*—Hopedale.

DISTRIBUTION. Lapland, Scandinavia.

Stereocaulon coralloides, *Fr.*—Chidley Peninsula.

DISTRIBUTION. Lapland, Scandinavia.

Stereocaulon paschale, *Ach.*—Anse Sablon, Nain, Hopedale.

DISTRIBUTION. Lapland, Scandinavia.

Alectoria ochroleuca, *Nyl.*—Chidley Peninsula, Anse Sablon, Nain, Hopedale.

DISTRIBUTION. Lapland, Scandinavia.

Bryopogon jubatum, *Link.*—Chidley Peninsula, Anse Sablon.

DISTRIBUTION. Lapland, Scandinavia.

Cetraria aculeata, *Fr.*—Chidley Peninsula, Hopedale.

DISTRIBUTION. Lapland Scandinavia.

Cetraria islandica, *Ach.*—Anse Sablon, Nain, Hopedale.

DISTRIBUTION. Europe, Lapland, Scandinavia.

Parmelia physodes, *Fr.*—Anse Sablon.

DISTRIBUTION. Lapland, Scandinavia.

Parmelia saxatilis, *Ach.*—Anse Sablon.

DISTRIBUTION. Lapland, Scandinavia.

Parmelia stygia, *Ach.*—Hopedale.

DISTRIBUTION. Lapland, Scandinavia.

Platysma nivale, *Nyl.*—Chidley Peninsula, Anse Sablon, Nain, Hopedale.

DISTRIBUTION. Lapland, Scandinavia.

Ochrolechia tartarea, *Massal.*—Chidley Peninsula.

DISTRIBUTION. Lapland, Scandinavia.

Nephroma arcticum, *Fr.*—Chidley Peninsula, Anse Sablon, Nain, Hopedale.

DISTRIBUTION. Lapland.

Solorina crocea, *Ach.*—Chidley Peninsula.

DISTRIBUTION. Scandinavia.

Gyrophora sp.—Chidley Peninsula.

Pertusaria sp.—Chidley Peninsula.

FUNGI.

Cantharellus aurantiacus, *Fr.*—Chidley Peninsula.

DISTRIBUTION. Scandinavia.

Bovista nigrescens, *L.*—Chidley Peninsula.

DISTRIBUTION. Scandinavia.

Russula sp.—Chidley Peninsula.

XVII.—DISTILLATION OF CAMPHOR.

(*Cinnamomum Camphora*, Nees.)

The subject of Camphor was discussed in the volume of the *Kew Bulletin* for 1899; its distillation is dealt with on p. 61. In a recent communication from the Government of Madras (Revenue Department, G.O., 1013, dated October 10th, 1906) this part of the subject has been further dealt with, and an extract from a lecture delivered on May 14th, 1906, before the Ceylon Agricultural Society, by Mr. M. K. Bamber, is given in full. The extract, which is of value as supplementing the previous accounts of the process, is now reprinted.

"The still required for the purpose is of the simplest description and very similar to that used by the Japanese in Formosa, with slight improvements in the condensers as perfect condensation is absolutely essential for success. The slightest smell of escaping camphor may mean a loss of 20 per cent. or more as has been proved by several experiments, and the two means of preventing it and obtaining the maximum proportion of camphor to oil are absolute condensation and slow distillation with a minimum of heat.

"The still may consist of an ordinary wooden cask, but is better if somewhat conical in shape and should be about 6 feet high, 3 feet diameter at the bottom and 2 feet 6 inches at the top, and have a close fitting door at the lower end for the removal of the refuse prunings. The top or a portion of it must be removable

but capable of being hermetically closed. From near the top a large diameter bamboo 5 feet to 7 feet long passes to the condensing boxes of wood placed in a suitable tank and connected with short lengths of similar bamboo. The still has a perforated bottom and stands over an iron basin built into a small stone or brick furnace. The basin about 2 feet 6 inches to 3 feet in diameter is fitted with a supply tube for adding water as required and an overflow pipe closed with a plug during distillations. The condensing boxes consist of bottomless boxes of suitable size having three or more partitions in each with communications at opposite ends of each division to insure thorough circulation of the camphor and water vapours. The tops of the boxes are hermetically closed about 1 inch below the upper edges and the boxes are stood in the tank as mentioned above being connected by short bamboo lengths. Cold water from a stream flows from a pipe or bamboo on the top of each box and then overflows into the tank which has an outlet pipe 2 inches to 3 inches from the bottom. By this means a water seal 3 inches deep is kept round the bottom of the boxes. The mixture of camphor vapour and steam from the still enters the first box just above the water level, circulates round the various partitions, and so passes from box to box, the camphor being condensed in pure white crystals on the walls and partitions as it cools down. The last box is fitted with an outlet of bamboo, which can be kept closely plugged with straw. This acts as a safety valve and enables one to ascertain whether condensation is perfect, as there should be little or no smell of camphor observable. In working, the still is loosely filled with the fresh prunings as brought in, the top put on and well luted with clay, water poured into the basin, and a fire lit to bring it rapidly to the boil. As soon as this occurs and a slight smell of camphor or eucalyptus can be smelt at the escape tube on the last box, the fire is reduced and the water merely kept hot for several hours. A good plan is to have a glass let into the cover of the first (or all) of the condensing boxes and as soon as vapour begins to condense on it to immediately reduce the fire to a minimum, as the object to be gained is to drive off all the camphor with as little steam as possible. A small wooden spigot in the top of the still makes it possible to ascertain when all smell of camphor has disappeared, but care must be taken when opening it not to become scalded. When completed, probably in 3 to 4 hours, the door at the bottom of the still is opened, the prunings removed and the still recharged from the top. All water in the pan which contains much tannin, &c., in solution is changed by opening the overflow plug and pouring in a fresh quantity through the supply tube. During distillation it is necessary to occasionally add some water to the pan to maintain a constant level and prevent burning. To save time it would be best to have two stills connected with the condensers as with many citronella grass stills, since the one could be filled, while the other distillation was proceeding; the latter could then be allowed to cool down before opening without a loss of time. To preserve the heat in the top of the still and ensure the camphor passing away readily, the still should be thickly coated with clay or other non-conducting material, the Japanese method being to surround the still with cane work and ram clay into the space between.

"When a condenser is seen to contain sufficient camphor, it should be opened and the camphor carefully scraped out, every precaution being taken to keep it free from dirt, or fragments of any description; otherwise redistillation would be necessary if the best price is to be obtained. A wooden scraper should be used, contact with metal being avoided as far as possible, while in the moist condition. The camphor should be placed in a well-made box like a tea-chest having a perforated false bottom 4 inches or 5 inches from the actual bottom and the top perfectly closed. In a few days, most of the oil will have drained into the lower portion of the box which should be zinc-lined and the dry camphor can be removed and carefully packed in zinc-lined cases for despatch.

"By reducing the camphor-oil to a low temperature fully 50 to 60 per cent. of solid camphor separates out and can be removed with a cloth strainer and well drained, the temperature being kept as low as possible, while the excess of oil is draining away.

"Should any of the camphor be accidentally discoloured, it should be thrown back into the still with a subsequent charge of prunings for redistillation. The question of purification by sublimation, redistillation of the oil for the production of safrol, white oil and other products will be fully gone into in the circular previously referred to and need not be discussed here. The chief uses of camphor are for the manufacture of celluloid, smokeless explosives, fireworks, &c., and medicinally in the treatment of influenza, dysentery and cholera. For the latter disease, it was used most successfully in Naples in 1854, all the cases treated recovering, and it was employed with equal success in Liverpool in 1866. Any outbreak of influenza increases consumption at once, but the chief demand is for the manufacture of smokeless powders and celluloid; it is also said to be employed in one of the numerous rubber substitutes now manufactured."

XVIII.—CHLAMYDITES: A NEW GENUS OF COMPOSITAE.

J. R. Drummond.

Char. gen.—*Herba* demissa, lanata, scapigera; folia, plerumque radicalia, parva. *Capitula* heterogama, radiata homochroma (?); flosculi ♀ omnes externi uniseriati ligulae-formes, breves, apice sub-acuto; ☿ in disco pluri-seriati infundibuliformes 5-lobulati, lobis aequalibus acutis, lobulo quoque sub apicem villorum canescentium cristâ flosculum supereminante externe ornato. *Phyllaria* infrâ connata involucrum poculiforme 5-vel plurilobatum formantia. *Antherarum* bases rotundatae integrae. *Styli* brachia sub-clavata denique acuminata, papillosa. *Achaenia* linearia sub-compressa hispida, omnia papposa; pappi setae ∞ seriatae, subaequales, barbellatae.

Observ.—Asteroidearum sub-tribus "Heterochromearum" hodie prompter nonnullas species in regione Indo-Sinensi nuper detectas

quibus homochroma sunt capitula constare nequitur; itaque haec nova species inter Asteroideas facilius locari posset, si vero, quod in exsiccatis incertum manet, flosculi discoidei purpurpeo-lilacini inveniantur; sed cum ad involucri faciem, ab *Asteroidearum* normâ toto caelo remotam atque alias notas respiciamus, tunc proprior affinitas cum *Senecionideis*, praesertim cum *Tussilagineis* indicabitur, at maxime cum singulari illâ planta quam b. Decaisnius (in Jacquem. Itin.) sub nomine '*Ligularia nana*' primum descripsit, postea illustr. G. Benthamius in genus '*Werneria*' transtulit. *Werneria* reverâ hodierno consensu inter fines Asiae nusquam expectanda videtur; "Werneria nana," cl. Hemsleium sequentibus, inter Cremanthodia locanda, vel, duce cl. Franchetio in volumine Senecionium submergenda, erit: plantam Himalae Boreali occidentalis, quae ill. Hookerio fil in Fl. Br. Ind. III. p. 357. "Werneria Ellisii" constituit, a *Senecionis* (*Ligulariae*) specie "S. arnicoides, Wall." p. 351 ibidem distinguere difficile videtur. Cum *Cremanthodium*, sicut aliqui suaserunt, pro genere abrogare conveniat, tum quidem planta nostra ab omnibus *Senecionibus* propter disci flosculos cristatos dissociari debet, qui character, tanquam in *Arctotidis* pro generico non ponderatus fuit, cum inter omnes ceteros *Compositarum* tribus abesse videtur, in *Senecionideis* majoris aestimationis dignus apparet. Typus hic, forsan archaicus, nulli existenti arctius alligatus inter *Tussilaginem* et *Seneciones* (*Cremanthodiis* inclusis) allocandus videtur. Nomen propter indumentum plantae, atque flosculorum ♀ lobulos quasi chlamydii laciniis villosis cristatos e voce 'Chlamys' (chlamydion) assumpsum.

Chlamydites Prainii, sp. nov.

Rhizoma satis robustum sub-lignosum perenne, petiolis senectis imbricatum, mox in plures caules divisum, quarum ex unâ scapus horizontalis seu ascendens uniflorus editur, ab alteris officium stolonum agitur: scapo vix semipedali unicum capitulum, sesquiunciali diametro, disco amplo, involucro villosissimo sustinetur. *Folia* radicalia longepetiolata laminâ ad 4 cm. productâ spathulatâ, margine obscure et remote sinuato-dentato, apice obtusato, caulina pauca sessilia, omnia plus minus candide lanata, seu sericeo-villosa, radicalia crassiora. *Scapus* sub-capitulum valde incrassatus. *Involucri* lobi basi duplo longiores, lineari-lanceolati obtusati, parte inferiore villis coactis versus apices distinctis vestiti. *Ligulae* super involucrum parum extrusae lineari-lanceolatae planae sub-acutae, persistentes. *Discus* sub-convexus alveolatus, ad semiunciam latus; flosculi discoidei purpureo-lilacini. *Achaenia* arguta 6–8 mm. longa hispido-canescentia; pappus luteo-albescens, ligulis brevior, achaeniis 2-3-vicem longior, maturus involucrum supereminans.

HAB. TIBET: Kambajong, *D. Prain*, Sept. 1903; Lhasa, *Walton*, Aug. 1904.

In habit this somewhat resembles certain Allardias; also, but less closely, a plant regarded by Asa Gray as akin to *Aster pygmaeus* (but named by him *Erigeron Muirii*), as well as *Erigeron lanatus*, Hooker; while the shape and proportion of the ligules, the arrangement of the florets and their colouring recall certain Gerberas; but the true affinity is clearly with the curious

Tibetan plant which Mr. Hemsley has named *Cremanthodium Deasyi* (Werneria nana, *Benth.;* Senecio Clarkeanus, *Franch.;* etc.) *Werneria* is almost exclusively an Andine genus, with perhaps a scanty representation in the Atlantic and Abyssinian regions of North Africa; and in any case we should follow Mr. Hemsley in excluding the 'Ligularia nana' of Decaisne from *Werneria;* but the very remarkable villous tufts on the segments of the disc-florets of the E. Tibetan plant suggest the propriety of placing it in a genus by itself though near to *Cremanthodium*, or —if that must be merged in *Senecio*—then between *Senecio*, (section *Cremanthodium*) and *Tussilago*. The name refers to these appendages which resemble ermine tufts on a mantle or tippet.

XIX.—ALPINE NOTES FROM SIKKIM.

(With Plate.)

Mr. I. H. Burkill, Reporter on Economic Products to the Government of India, paid an autumn visit to Phallut in 1906 in search of Aconite tubers. The following extracts from a letter recently received from him give particulars of the interesting country through which his route lay. The accompanying plate has been prepared from two photographs sent with the letter. The upper view shows a group of trees of *Rhododendron arboreum*, Smith, with, in the foreground, part of an alpine meadow filled with an *Iris*, probably *I. Clarkei*, Baker. The lower view shows a group of trees of *Abies Webbiana*, Lindl.; in the distance is seen the Sandakphu ridge; the open glade in front is occupied by *Aconitum spicatum* and a hybrid Aconite, *A. spicatum* × *laciniatum*.

"Calcutta, 15th October, 1906.

"I found my second trip to Phallut interesting and agree-"able . . . One result is the few enclosed seeds. You will "note that there are three packets of Impatiens seed; 27688 is "undoubtedly *I. radiata*, I send its seed because of the cleistogamy "of its latest flowers. I think that the other two are *I. longipes* "and *I. stenantha*, and if Sir Joseph Hooker could see them alive "the great general similarity yet with conspicuous differences "would interest him.

"It is very desirable that species of Impatiens should be figured "from life; dead, the difficulty of discriminating them is "increased a thousandfold. The seed labelled *I. stenantha* is of "a plant with red speckles on the yellow flower which run "together into blotches on the spur, while the *I. longipes* is pure "lemon yellow. Both are the same size, and equally oblique-"flowered, but the spur of 'stenantha' turns up at the tip and the "spur of 'longipes' does not. The flowers on 'stenantha' are "far more abundant than on 'longipes', the leaves denser and the "pods a little thicker. I had some difficulty in getting ripe seed.

VIEWS IN SIKKIM.

To face page 92.

"In the Corydalis packet are seeds of three species; the "common yellow one of Phallut; the very similar white one of "beyond Phallut; and one which has no leaves on its flowering "stem. In the last I have little interest, but it is very pretty. "With the two first when they grow together is a tawny-flowered "similar plant and I wondered if the two could hybridise to form "the tawny-flowered plant. I have botanical specimens which "will enable me to name the plants.

"The last packet is of the Viola of Tonglu. Hooker in *Hooker's* "*Journ. Bot.*, vol. ii., 1850, p. 118, and Clarke in the Linnean "Society's *Journal*, vol. xv., p. 132, mention it without a name. "I have not seen flowers, but I collected the seed because these "Violas want figuring from nature. The angle at which the "lateral petals stand, and the position of the upper ones, in a "moment distinguish two species that from herbarium material "were united in the *Flora of British India.*

"Now that I have explained what has made me send these "seeds I will go on to the trip. I had a halt of one day at "Sandakphu where my coolies collected for me *Aconitum* "*laciniatum* and *A. laciniatum* × *spicatum;* but the halt gave me "no time for botanising as I had to go out with the coolies and to "indicate every root that was to be dug up and into which basket "it should go. Then I had two days' halt at Phallut. On the "first I went in the rain to the top of Singlela, having sent my "coolies out in two parties, one to hunt *A. heterophylloides* and the "other to dig up all there was at an indicated spot on Sabarkum. "On the second day, as the coolies had brought me in *A. spicatum* "and not *A. heterophylloides*, I was obliged to go out with them "again . . . Fortunately my Lepcha bearer-sirdar proved his "value by going off in another direction and bringing me in just "what I wanted, so I returned with six cooly loads of roots.

"The weather gave me morning views—up to 8 a.m.—on more "than half of the days out, and only drenched me twice, so that "I have not to complain of it. The season was late and I was "early—my other visit was in the middle of October, so that I saw "the plants in flower that I had only seen dead before. Sandak- "phu was covered with flowering *Aconitum spicatum.* The lilac "Asters in the grass of Sebarkum were not all over. There "were lots of white Umbellifers on Phallut and Corydalis in "quantity beyond. *Meconopsis paniculata* was not wholly over. "Two Pedicularis were still out. *Saxifraga diversifolia*, which "is everywhere, was only just at full flower, and two other yellow "Saxifrages were not quite over. Even *Potentilla fruticosa* had "a few flowers on it. But Phallut and Singlela were red with the "autumn leaves of an Euphorbia and beyond Sandakphu the "beginning of the end of the season was obvious.

"I amused myself by the wayside making flower pollination "notes and am now writing up a short paper. Two things come "out strongly; 1, there is not a tree in flower in autumn up there, "but there are very many herbaceous plants; and 2, an unusual "proportion of the flowers face the earth, *e.g.*, the Rosae, the "Heliotrope-set, Triplostegia—in which one would not expect "earth-facing species, and things like Crawfurdia, the Aconite,

"Satyrium, Impatiens. I think they would all 'like to go into "'the ark for to get out of the rain.'

"I got two diminutive Utricularias in moss, one at Jorpokri "(lilac) and one on Sabarkum and the summit of Singlela (white). "I found plenty of my *Swertia tonglensis* on Tonglu and "Kalipokri. I found a new form at Jorpokri, something like *S.* "*Dalhousieana* but not it.

"The bees I collected visiting flowers I cannot name. It strikes "me that they are very ill known. A very handsome yellow- "ringed fellow goes to *Impatiens arguta*. Aconite is much "visited by them. The long-tubed Composites get the visits of "the long-tongued flies of the genus Vollucella. I caught one of "these flies and measured its tongue, which stretched to 22 mm.; "most likely the insect can suck honey from a tube 18 mm. long "which is just what the largest *Bombus hortorum* can do in "England. The bees of Sikkim go to work in the rain, which "is what English bees do not."

XX.—REDUCTIONS OF THE WALLICHIAN HERBARIUM.—II. GESNERACEAE.

C. B. Clarke.

Gesneraceae.

407. *Wulfenia obliqua*, Wall. (2 sheets) = Rhyncoglossum obliquum, Blume, var. parviflora, C. B. Clarke.

408. *Wulfenia intermedia*, Wall. (2 sheets)=Rhyncoglossum obliquum, Blume.

409. *Wulfenia Notoniana*, Wall. (1 sheet) = Klugia Notoniana, A. DC.

777. *Didymocarpus punduana*, Wall. (1 sheet), is good.

778. *Didymocarpus Rottleriana*, Wall. (3 sheets), is good.

779. *Didymocarpus crinita*, Jack (1 sheet), is good.

780. *Didymocarpus frutescens*, Jack (2 sheets), is good.

781. *Didymocarpus cordata*, Wall. (1 sheet), is good.

782. *Didymocarpus subalternana*, Wall. (2 sheets), is good.

783. *Didymocarpus macrophylla*, Wall. (3 sheets), type sheet is good; sheet 784 β = Didymocarpus pedicellata, R. Br.; sheet 784 γ is good.

785. *Didymocarpus aromatica*, Wall. (1 sheet), the chief part is good. The example in late fruit, in the right hand lower corner of the sheet, marked by D. Don in his own hand as the type of his *D. plicata*, is D. macrophylla, Wall. (as stated by R. Br.).

786. *Didymocarpus obtusa*, Wall (1 sheet) = DIDYMOCARPUS CINEREA, D. Don.

787. *Didymocarpus reptans*, Jack (1 sheet), is good.

788. *Didymocarpus ? hamosa*, Wall. (3 sheets) ; type sheet, sheet 788 β = CHIRITA HAMOSA, R. Br. ; sheet 788 γ = CHIRITA HAMOSA, R. Br. ? var. FINLAYSONI, C. B. Clarke.

789. *Didymocarpus ? helioteroides*, Wall. (1 sheet) = BAEA WALLICHII, R. Br.

790. *Didymocarpus mollis*, Wall. (1 sheet), is good.

791. *Didymocarpus lanuginosa*, Wall. (1 sheet), is good.

792. *Didymocarpus conchorifolia*, Wall. (1 sheet), is good.

793. *Didymocarpus ? multiflora*, Wall. (1 sheet) = BAEA MULTIFLORA, R. Br.

794. *Aeschynanthus bracheata*, Wall. (2 sheets), is good.

795. *Aeschynanthus longiflora*, Wall. (1 sheet) = AESCHYNANTHUS SUPERBA, C. B. Clarke.

796. *Aeschynanthus parasitica*, Wall. (3 sheets) ; type sheet contains 3 plants, viz. :—

Upper left hand marked X = AESCHYNANTHUS MACULATA, Lind.

Upper right hand marked Y = AESCHYNANTHUS GRANDIFLORA, Spreng.

At the bottom marked Z = AESCHYNANTHUS MICRANTHA, C. B. Clarke.

Sheet 796 β contains 2 plants, viz. :—

Upper left hand marked M = AESCHYNANTHUS GRANDIFLORA, Spreng.

Upper right hand marked N = AESCHYNANTHUS MACULATA, Lindl.

Sheet 796 γ = AESCHYNANTHUS GRANDIFLORA, Spreng.

797. *Aeschynanthus fulgens*, Wall. (1 sheet), is good.

798. *Aeschynanthus radicans*, Jack (2 sheets), type sheet = AESCHYNANTHUS WALLICHII, R. Br. ; second sheet = AESCHYNANTHUS GRIFFITHII, R. Br.

709. *Aeschynanthus ramosissima*, Wall. (1 sheet), is good. (This is marked by D. Don in his own hand as his *Trichosporum parviflorum*.)

800. *Calosacme grandiflora*, Wall. (2 sheets) = CHIRITA VERTICAEFOLIA, Buch.-Ham.

801. *Calosacme flava*, Wall. (1 sheet) = CHIRITA PUMILA, D. Don.

802. *Calosacme acuminata*, Wall. (3 sheets) ; type sheet, sheet 802 β = CHIRITA ACUMINATA, R. Br. ; sheet 802 γ = DIDYMOCARPUS ACUMINATA, R. Br.

803. *Calosacme dimidiata*, Wall. (1 sheet) = CHIRITA DIMIDIATA, R. Br.

804. *Calosacme polycarpa*, Wall. (3 sheets) = LYSIONOTUS SERRATA, D. Don.

805. *Calosacme macrophylla*, Wall. (2 sheets) = CHIRITA BIFOLIA, D. Don.

—— Sheet found next n. 806, marked "Amongst the Didymocarpeae n. 34, *see* Notes" = Rubiacea (very badly preserved).

807. *Cyrtandra frutescens*, Jack (3 sheets), type sheet contains 2 plants, viz. :—
Left hand = CYRTANDRA DECURRENS, De Vriese.
Right hand = CYRTANDRA DISPAR, DC.
Sheet 807 β = CYRTANDRA DECURRENS, De Vriese; sheet 807 γ = CYRTANDRA DISPAR, DC.

808. *Cyrtandra ? acuminata*, Wall. (2 sheets) = CYRTANDROMAEA ACUMINATA, Benth. et Hook. f.

—— Sheet found next 808 marked "*Chelone ? latifolia*, Goyalpara," by Buch.-Ham. = RHYNCOTECHUM LATIFOLIUM, Hook. f. & T. Thoms.

809. *Loxonia ? alata*, Wall. (1 sheet) = DIDYMOCARPUS INCANA, Benth. et Hook. f.

4410. *Platystemma violoides*, Wall. (1 sheet), is good.

4411. *Platystemma majus*, Wall. (1 sheet), = PLATYSTEMMA VIOLOIDES, Wall.

6394. *Glossanthus malabarica*, Klein (2 sheets) = KLUGIA NOTONIANA, A. DC.

6395. *Glossanthus ? grandiflora*, Benth. (1 sheet) = STAURANTHERA GRANDIFLORA, Benth. (errore typogr. *Staurantheria grandifolia*).

6395. *Didymocarpus Missionis*, Wall. (1 sheet), is good.

6397. *Aeschynanthus acuminata*, Wall. (1 sheet), is good.

6411. *Corysanthera elliptica*, Wall. (1 sheet) = RHYNCOTECHUM ELLIPTICUM, A. DC.

[7131]. *Cyrtandra ? lanuginosa*, R. Br. (1 sheet) = ISANTHERA PERMOLLIS, Nees (but the sheet is without any Wallichian ticket or number).

7495. *Cyrtandracea* (1 sheet) = SYLVIANTHUS BRACTEATA, Hook. f., inter Rubiaceas.

[9073]. *Isanthera permollis*, Nees. This number is wholly missing in the Wallichian Herbarium, but the duplicate sheet of this number at Kew is good.

[9079]. *Rhyncotechum ?* (1 sheet), contains 2 plants, viz. :—
a. Upper = BAEICA FILIFORMIS, C. B. Clarke.
b. Lower = BAEICA GRIFFITHII, C. B. Clarke.
(This sheet was found without Wallichian number or label. I have placed it under 9079 because the duplicate sheets of that number at Kew contain *Baeica filiformis* and *B. Griffithii*.)

[9080]. *Epithema ?*. Number wholly missing in the Wallichian Herbarium. The duplicate sheet of n. 9080 at Kew = EPITHEMA CARNOSUM, Benth.

XXI.—ADDITIONS TO THE WILD FAUNA AND FLORA OF THE ROYAL BOTANIC GARDENS, KEW: II.

The appearance of "The Wild Fauna and Flora of the Royal Botanic Gardens, Kew," which was referred to in the *Bulletin* for 1906, p. 42, has been followed by the receipt of numerous letters, some of them critical as to matters of detail, but all of them in accord as to the debt of gratitude due to Sir W. T. Thiselton-Dyer for the happy thought which inspired and the perseverance which, in spite of many difficulties, brought to a successful issue the preparation of the work. It is particularly gratifying to be able to add that neither those whose allusions are merely appreciative nor those whose remarks take the form of welcome, because justifiable, criticism have shown any desire to rest content with mere comment. To some the work bids fair to prove an inspiration to prepare for other localities a corresponding record ; to others, and this more immediately concerns us, it has suggested the idea that the way in which they can most practically show their appreciation of what has already been done is to endeavour to supplement it. Simultaneously with the appearance of the work itself, the first addition to the wild fauna and flora of Kew appeared in the *Bulletin* (New and Additional Species of Fungi occurring in the Royal Botanic Gardens, Kew : *K. B.*, 1906, p. 46), and it is proposed to place on record from time to time the results obtained by the willing workers who are engaged in the study of the various natural groups dealt with in the original work. The present note, which deals with the Coccids or Scale Insects, is therefore the second of a series of supplementary articles, the contents of which may, it is hoped, at a later date be incorporated in a revised edition of the original work.

HEMIPTERA-HOMOPTERA.

COCCIDAE (Scale Insects).

R. NEWSTEAD.

This supplementary list of the Coccids includes but a single species that is new to the Kew fauna, but the list of food plants has been considerably augmented, and from this point of view

the records are of additional interest and value to the student in this group of insects. They are also important from an economic point of view as determining the nature and extent to which the various species confine their attacks to one or more groups of plants.

At Kew we have discovered up to the present 46 species representing 24 genera, and, as previously stated,* this far surpasses any other record for an equal area in the British Isles, representing, in fact, about one-half of the recorded species for this country. Of this grand total about 74 per cent. are aliens, and have been introduced on imported plants. Of these aliens three have been completely exterminated—formerly there were four—but of these *Gymnococcus agavium* has apparently been re-introduced since the publication of the first list of these insects.

Our thanks are due to Mr. G. Nicholson and his colleagues for the care and attention they have given to the collecting of the material.

Freshly imported plants may often be found to harbour coccids, and a careful search should invariably be made with a view to preventing the introduction of a new pest. I shall at all times be pleased to examine any material that may be sent to me.

The nomenclature of the Coccidae has considerably changed since the publication of the first list, but in order to avoid confusion the names given in the previous catalogue have been retained. Any changes in the generic or specific names are given in brackets.

DIASPINAE.

Aspidiotus (*Chrysomphalus*) **personatus**, *Comstock*. Male and female puparia. On *Tillandsia Griesseniana*. Coll. R. Kett. This minute species confines its attacks almost exclusively to various species of *Tillandsia* in this country, but is rare. Outside the British Isles it has been recorded from the West Indies, Mexico, and British Guiana.

Aspidiotus hederae, *Vall.* Male and female puparia. On *Haworthia semipapillosa* (House No. 7). and *Mesembryanthemum Bolusii* (House No. 5). Coll. C. P. Raffill.

Aspidiotus zonatus, *Frauenf.* Male puparia only. On *Quercus pedunculata*. Coll. G. Nicholson. This is an indigenous species, and new to the Kew fauna. The male puparia are invariably formed upon the leaves, and the specimens from Kew made the prettiest little colonies I have yet seen. The females locate themselves on the smaller branches of the oak, and from their colour, which closely resembles the bark, they are most difficult to detect.

Diaspis boisduvalli, *Sign.* All stages. On *Phormium tenax* (Winter Garden). Coll. W. Taylor. This plant also harboured *Dactylopius citri* (q.v.). Also on *Cymbidium Aloifolium*, *C. Lowianum*, *Cattleya Aclandiae*, *Ornithidium coccineum*, and *Laelia*

* The Wild Fauna and Flora of the Royal Botanic Gardens, Kew Bull. of Miscel. Information. Additional Series V., p. 21.

purpurata. Coll. G. Nicholson. This is a greenhouse pest in this country. It also occurs, under glass, in the United States, and in the open air in Mexico, West Indies, Brazil, Australia, New Zealand and elsewhere. It feeds on a variety of plants.

Chionaspis (*Hemichionaspis*) **aspidistrae**, *Sign.* In all stages on the stem scales of *Zamia Loddigesii*. Coll. R. Kett. This is a fairly common species in Great Britain. It has also been recorded from Australia, Brazil, Trinidad, India, Japan, in Canada (under glass), and elsewhere. Its favourite food plants are various kinds of ferns, but it has also been found on orange, mango, fig, pepper, &c.

Pinnaspis buxi, *Bouché*. Female only. On an unnamed monocotyledon, and on *Monstera deliciosa*. Coll. G. Nicholson. Less common than the preceding species in Great Britain. Common in the West Indies, and has been recorded from the United States (? under glass), and elsewhere.

Mytilaspis pomorum, *Bouché* (= *M. ulmi*, Linn.). Females only. On *Cotoneaster* sp., *Cornus alba*, and *Helianthemum* sp. Coll. W. Dallimore. This is the well-known "Mussel Scale" of the apple. It feeds, however, on a variety of plants, and has a wide geographical distribution.

LECANIINAE.

Lecanium (*Calymnata*) **hesperidum**, *Linn.* Females and male puparia. On *Carludovica palmata*. Coll. G. Nicholson. This common species is largely parthenogenetic, the males being extremely rare—in fact have been discovered on two or three occasions only. The finding of the male puparia at Kew is therefore of great scientific interest. It is a general feeder, and almost cosmopolitan in its distribution.

Lecanium (*Calymnata*) **hesperidum**, var. **alienum**, *Douglas*. Females only. On *Furcraea macrophylla* and *Aloe ciliaris* (House No. 5). Coll. G. Nicholson. Common and generally distributed.

Lecanium (*Eulecanium*) **persicae**, var. **sarothamni**, *Douglas*. Females only. On *Cotoneaster*. Coll. G. Nicholson. This may be considered a phytophagous variety of the common peach scale; it is smaller than typical examples from the peach, but does not differ in any other particular.

Lecanium sp.? Possibly *L. hesperidum*, but the specimens were all badly parasitised with a chalcid larva, and could not be definitely fixed. On *Aloe ciliaris* (House No. 5). Coll. W. Down.

Lecanium (*Saissetia*) **oleae**, var. **testudo**, *Curtis*. Females only. On *Furcraea* sp. and *Aloe ciliaris* (House No. 5). This variety has not occurred outside the British Isles. It is much smaller and browner than typical *oleae*.

Dactylopius (*Trechocorys*) **citri**, *Risso*. Females only. On *Phormium tenax* (Winter Gardens). Coll. W. Taylor. This is the common "Mealy Bug," and has been met with on a variety of plants in nearly all parts of the world.

Dactylopius (*Trechocorys*) **longispinus**, *Targ.* Females only. On *Cypripedium grande.* Coll. G. Nicholson. Almost as common and as widely distributed as the preceding.

Gymnococcus agavium, *Douglas.* In all stages but the perfect males. On *Agave deserti* and *A. Wislizeni* (House No. 5). Coll. W. Down. This species was first described from material discovered at Kew in 1888. Since that date the insect has been lost sight of until it was re-discovered at Kew in October, 1906. It is an interesting species, and has, I believe, not been recorded from any other habitat.

XXII.—MISCELLANEOUS NOTES.

Mr. W. J. Gallagher, a graduate of the Royal University of Ireland, has been appointed, on the recommendation of Kew, Mycologist to the Agricultural Department of the Federated Malay States. At the date of his appointment Mr. Gallagher held a Research Studentship from the Commissioners of the 1851 Exhibition, and was engaged in the study of plant diseases at Münden in Germany.

Dr. Otto Kuntze.—The "Gardeners' Chronicle" of February 16 announces the death of this well-known botanist on January 28, at San Remo, where he had resided for several years. He was most widely known from his publications on botanical nomenclature, wherein he applied certain rules as to priority with a relentless severity. But he was a sound systematist, and, apart from some peculiarities of thought, mainly the result of his extreme zeal in matters relating to names, he was a most agreeable, amiable and well-informed gentleman. He was, we believe, originally a manufacturing chemist, but having attained a competence he abandoned his business and made botany his principal study. His first work was a "Taschen-Flora von Leipzig," which appeared in 1867. In 1874 he started on a journey round the world, returning home in 1876 with a botanical collection of some 7,700 numbers. During his travels he wrote a series of letters which, in 1881, he published under the title "Um die Erde. Reiseberichte eines Naturforschers." A second edition of this original, entertaining and instructive book appeared in 1888. In the spring of 1887 he settled at Kew in order to work out his botanical collections. At that date the "Index Kewensis" was in course of compilation, and this fact may have had some influence on the direction of his subsequent researches in botanical literature. He soon developed into an uncompromising reformer of botanical nomenclature and became so convinced of the justice of his own views that he characterised the work of others in this direction who did not agree with him in unmeasured terms. In 1890 he completed his work at Kew and published the results under the title of "Revisio Genera Plantarum . . . cum Enumeratione Plantarum Exoticarum in Itinere Mundi Collectarum"—a volume of more than a thousand pages. In 1891 he went to South America

on a journey of 14 months' duration, crossing the continent twice and making botanical collections equal to those of his earlier travels. The results were published in 1891 under the same title and as Part iii. of the same work, and form a volume of nearly 800 pages, largely devoted to the discussion of questions of nomenclature. In addition to these bulky volumes Dr. Kuntze wrote numerous articles and pamphlets on his favourite subject, the last appearing only a few weeks ago. It is entitled : "Motivierte Ablehnung der angeblich vom Wiener Kongress 1905 angenommenen inkompetenten und fehlerreichen botanischen Nomenklatur-Regeln, sowie Vorschläge zur international endgueltigen Reform auf dem Bruesseler Kongress 1910." It should be added that although Dr. Kuntze's proposals are not all accepted, or acceptable, his writings teem with historical facts of the greatest interest, and well repay study.

W. B. H.

Hardy Heaths at Kew.—The soil of Kew, being of light quality and quite free from calcareous substances, proves to be admirably adapted for many members of the ericaceous family. The Rhododendron Dell, the Azalea Garden, and in a less degree the botanical collection near King William's Temple and the groups in the sunk garden west of the Palm House, have long been popular features of the garden. Several species of *Erica* itself thrive particularly well, especially those that blossom in the spring. During the past few years advantage has been taken of this fact to plant a few large groups in various parts of the garden. Two more have been added during the winter, one on a portion of the railed-in wild garden near the Berberis Dell, the other on a mound south-west of the Palm House. In the former more than a thousand plants were put out. *Erica mediterranea* enters largely into the composition of the spring-flowering groups. It is a beautiful Heath of which several varieties are in cultivation, one —*hibernica*—being found wild in the West of Ireland. Associated with it are *E. lusitanica*, *E. arborea*, *E. Veitchii* and *E. carnea*. It is believed these groups will become permanent and effective features. The plants commence to flower in February and early March, and provide ample breadths of charming colour for three months. All that is done by way of preparation is to trench the ground and add a little peat. This is also found to provide an admirable medium for growing choice, delicate-rooted plants like *Stewartia* and *Styrax* ; they not only thrive in the soil, but rejoice in the root shelter the undergrowth of Heath affords.

The Lake.—The chief piece of work in the Arboretum during the past winter has been the removal of the mud from the bed of the Lake. It is nine years since this was last done thoroughly. The Lake is filled by water taken from the Thames at high tide which brings with it in suspension a large quantity of mud. In some parts of the Lake it was found that this alluvial deposit had reached a depth of 1 foot 8 inches. This shows that a layer more

than 2 inches thick is being deposited yearly in some parts. At the upper end of the Lake, however, farthest away from the intake, the nine years' accumulation of mud was not more than 6 inches in thickness. A gang of 16 to 20 men was employed on the work for about seven weeks, and it is estimated that more than 4,000 cubic yards of mud were wheeled out. The mud when dry and aerated resolves into a soil of great richness. It makes an admirable top-dressing for lawns and trees, and for enriching the borders proves to be quite as valuable as top-spit loam.

Catalpa Bungei, *C. A. Meyer*.—The catalogues of many dealers in hardy trees and shrubs offer plants of *Catalpa Bungei* at very ordinary prices. But it is safe to say that not one of these nurserymen could supply a single plant of the true *C. Bungei* of C. A. Meyer. And, although many of the continental botanic gardens offer seeds of this tree also, they are really in similar case. For many years past we have desired to acquire this tree for the Kew collection. Seeds and plants from the sources above-mentioned have been from time to time procured, but they have always proved to be either *C. Kaempferi* or a dwarf variety of *C. bignonioides*. Now that we are fortunate to have obtained the true plant through the liberality of Professor Sargent of the Arnold Arboretum, it may be well to record its first genuine introduction to Britain.

The species was first described by Meyer as long ago as 1837 in the *Bulletin of the Imperial Academy of Sciences* of St. Petersburg. It is a native of several provinces of China and has been found by several collectors in the neighbourhood of Pekin. One of them—Mr. W. Hancock, F.L.S.—found it in flower there in May, 1880, and described it as "a handsome tree 20 to 30 feet high, with numerous purple and white flowers." The species is distinct enough not to be confused with the others in cultivation. The inflorescence, which is corymbose rather than thyrsoid, carries but few flowers compared with the other cultivated species, the number on each varying from three to twelve; the corolla is 1½ inches long and the same in width. The leaves are small in comparison with those of the American species or the *C. Kaempferi* with which it is so often confounded; the largest in the Kew Herbarium is 7½ inches long and 4½ inches wide, the smallest only 1½ inches long. They are ovate-acuminate, with a truncate or cuneate base, sometimes entire, but often coarsely scalloped so as to form from one to five or six large teeth on each side towards the base.

A figure of *Catalpa Bungei* may be found in the *Nouvelles Archives du Muséum d'Histoire Naturelle*, 3rd series, t. 4, where M. Edouard Bureau gives an elaborate review of the genus. Here he observes that he only knew of one genuine example of this species in France. It was in the Arboretum of the late M. Lavallée at Segrez.

W. J. B.

Wet Blocking of Rubber.—The following note, dated Peradeniya, 18th January, 1907, has been received from Dr. J. C. Willis :—

"At the Ceylon Rubber Exhibition it was suggested by Dr. Willis that it might be advisable, instead of as at present drying the plantation rubber till it only contains about 5 per cent. of moisture, to block it in the wet freshly coagulated condition. Experiments with this object were at once carried out by Mr. Kelway Bamber, the Ceylon Government Chemist. He prepared the rubber with creosote (to prevent decay and mould), and blocked it at once, getting blocks containing about 9 per cent. of water. These sold in London for 5*s.* 6*d.* per lb., against 5*s.* 7*d.* to 5*s.* 9*d.* for the ordinary dry Ceylon rubber, thus really getting a much better price. A circular ('Circular and Agricultural Journal of the Royal Botanic Gardens,' Peradeniya, Vol. IV., No. 1) has been lately issued dealing with this matter, and it would seem likely that the old way of making dry biscuits or sheets will soon be extinct."

Distribution of Rubber Plants from Kew.—The importance of rubber as a cultivated crop in our Asiatic possessions engaged the attention of the India Office about the year 1872, and the introduction into India, through the agency of Kew, of the principal American rubber-yielding plants was shortly thereafter decided upon.

The first stock of Central American Rubber, *Castilloa elastica*, was raised from cuttings brought by Mr. R. Cross in 1875. In June 1876, 70,000 seeds of Para Rubber, *Hevea brasiliensis*, were brought to England from the Rio Tapajos by Mr. H. A. Wickham, who had been commissioned to collect them. These were followed in November by about 1,000 young plants obtained by Mr. Cross, who had been sent to South America to bring home living plants in the event of its proving impossible to transmit alive to this country the very perishable seeds which Mr. Wickham had been commissioned to procure. As a matter of fact only about $3\frac{3}{4}$ per cent. of the seeds germinated and an extremely small proportion of the plants ultimately survived. At the same time Mr. Cross brought home seeds and plants of Ceara Rubber, *Manihot Glaziovii*. At a later date *Hevea Spruceana* was obtained.

For the introduction of African Rubbers belonging to the genus *Landolphia* in 1878–9 Kew was indebted to Sir J. Kirk, then H.B.M. Consul-General at Zanzibar. More recently the introduction of *Funtumia elastica* was effected from West Africa.

The following tabular statement shows the distribution of living plants of the various rubbers mentioned. In addition to plants, seeds were obtained from time to time and distributed to places where they were considered likely to thrive.

Species.	Localities.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.
Hevea brasiliensis.	Burma	—	—	—	50	—	—	—	—	—	—	—	—
	India (Calcutta)	6	—	—	—	50	—	—	—	—	—	—	—
	Ceylon	—	—	—	2,019	100	—	—	—	—	—	—	—
	Java	—	—	—	18	4	—	—	—	—	—	—	—
	Singapore ..	—	—	—	100	22	—	—	—	—	—	—	—
	Fiji	—	—	—	—	—	2	—	—	—	—	—	—
	Mauritius ..	—	—	—	—	37	—	—	—	—	—	—	—
	West Africa ..	—	—	—	—	6	—	—	—	—	—	—	—
	West Indies ..	—	—	—	30	6	—	—	—	—	—	—	—
	Great Britain..	—	—	—	692	—	—	—	—	—	—	—	—
Hevea Spruceana.	India (Calcutta)	—	—	—	—	—	—	—	—	—	—	—	—
	Ceylon	—	—	—	—	—	—	—	—	—	—	18	—
	Java	—	—	—	—	—	—	—	—	—	—	—	—
	Singapore ..	—	—	—	—	—	—	—	—	—	—	—	—
	Fiji	—	—	—	—	—	—	—	—	—	—	—	—
	West Africa ..	—	—	—	—	—	—	—	—	—	—	—	—
	West Indies ..	—	—	—	—	—	—	—	—	—	—	—	—
Castilloa elastica.	India (Calcutta)	—	—	5	—	—	—	—	—	—	—	—	—
	Ceylon	—	—	—	34	24	—	30	—	—	—	2	—
	Java	—	—	—	6	—	—	—	—	—	—	—	—
	Singapore ..	—	—	—	—	6	—	—	—	—	—	—	—
	Fiji	—	—	—	—	—	—	—	—	—	2	—	—
	Mauritius ..	—	—	—	—	6	—	—	—	—	—	—	—
	West Africa ..	—	—	—	—	3	—	—	—	—	—	—	1
	West Indies ..	—	—	—	1	—	—	1	12	—	—	—	—
Manihot Glaziovii.	India (Calcutta)	—	—	—	—	50	122	—	—	—	—	—	—
	„ (Madras)	—	—	—	—	—	120	—	—	—	—	—	—
	Ceylon	—	—	—	—	50	—	—	—	—	—	—	—
	Java	—	—	—	—	—	2	—	—	—	—	—	—
	Singapore ..	—	—	—	—	4	—	—	—	—	—	—	—
	Fiji	—	—	—	—	—	6	—	—	—	—	—	—
	West Africa ..	—	—	—	—	4	—	—	—	—	—	—	1
	West Indies ..	—	—	—	—	—	28	3	3	—	—	—	—
Landolphia	India (Calcutta)	—	—	—	—	—	—	—	—	—	—	2	4
	Ceylon	—	—	—	—	—	—	—	1	58	8	—	—
	Java	—	—	—	—	—	—	—	—	—	—	—	—
	Singapore ..	—	—	—	—	—	—	—	—	4	—	—	—
	Fiji	—	—	—	—	—	—	—	—	10	12	—	—
	Mauritius ..	—	—	—	—	—	—	—	—	—	—	3	—
	West Indies ..	—	—	—	—	—	—	—	48	36	32	25	2
Funtumia elastica.	India (Calcutta)	—	—	—	—	—	—	—	—	—	—	—	—
	Ceylon	—	—	—	—	—	—	—	—	—	—	—	—
	Java	—	—	—	—	—	—	—	—	—	—	—	—
	Singapore ..	—	—	—	—	—	—	—	—	—	—	—	—
	West Indies ..	—	—	—	—	—	—	—	—	—	—	—	—

1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	REMARKS.
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
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—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	—	106	—	—	9	6	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	To nurserymen and others.
—	—	6	—	—	—	—	6	—	—	—	—	—	—	—	
—	—	6	—	—	—	—	—	—	—	—	—	—	—	—	
—	—	12	—	—	—	—	—	—	—	—	—	—	—	—	
—	—	12	—	—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	
—	—	2	—	—	—	—	24	—	—	—	—	—	—	—	
—	—	12	—	—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	3	2	—	—	—	—	—	—	
2	—	—	—	—	—	—	—	1	—	—	—	—	—	—	
—	—	—	—	—	—	—	36	—	—	—	75	50	6	4	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Presentations to Museums.—A section of the stem of *Ipomoea peltata*, Choisy (*Convolvulaceae*), has been forwarded to the Museum by Mr. H. N. Ridley, Director of the Botanic Gardens, Singapore. The section is 6 inches in diameter, and will be found in Case 81 ; Museum No. I.

With this came also a portion of the stem of *Entada spiralis*, Ridley (*Leguminosae*), which well illustrates the characteristic spiral growth. *See* Case 43 ; Museum No. I.

Mr. Ridley has also presented an interesting illustration of a branching palm stem. It is of an Areca Nut Palm (*Areca Catechu*), from Pulau Kukub, Singapore. The stem has five branches, and we understand from the donor that a description of the palm has been sent for publication in the *Annals of Botany*. This latest addition to the Museum has been placed near the door in the west end of the Timber Museum.

FATTY OILS.—The Museum is indebted to Messrs. James Bibby and Sons, of Liverpool, for a valuable collection of oils and their products, including cocoa-nut, cotton, linseed, &c., which have been placed in their respective natural orders in Museums No. I. and No. II.

SWEDISH BEER FLAGONS.—Mr. R. H. Beamish, Glounthaune, Cork, has presented two beer flagons, used by the Dalecarlian peasants. They are formed of several woods, but chiefly of Norway spruce (*Picea excelsa*, Link ; *Coniferae*) and beech (*Fagus sylvatica*, L. ; *Cupuliferae*). These have been placed in the Annexe, Museum No. III.

Dr. Engler, Director of the Royal Botanic Gardens and Museum, Berlin, has forwarded for the Museum some illustrations from the *Botanische Jahrbücher* of several species of *Cecropia* (*Urticaceae*) as they grow in their native habitat, and showing their peculiar structure. These will be found in Case 115, Museum No. I., where are also some articles made of the wood of the Trumpet tree (*C. peltata*), of Tropical America. The hollowed trunk and branches of this species are used by the natives for musical instruments ; the wood, which is exceedingly light and soft, is employed for floats for fishing. The bark yields a tough fibre, and the rough leaves are used as a substitute for sand-paper.

J. M. H.

Botanical Magazine for February.—The plants figured are : *Nerine Bowdeni*, W. Wats. ; *Olearia speciosa*, Hutchinson ; *Meconopis punicea*, Maxim. ; *Ribes mogollonicum*, Greene ; and *Saccolabium rubescens*, Rolfe, all of which are represented by examples in the living collections at Kew. The *Nerine* is allied to *N. lucida*, Herb., from which it differs in its longer pedicels, and larger flowers with broader segments. It was introduced from Cape Colony by Mrs. Cornish Bowden, of Newton Abbot, and several bulbs were presented by her to Kew. The *Olearia* is a

new species from Australia, seeds having been received from the Botanic Gardens, Melbourne, in 1888. It is an ornamental species resembling *O. dentata*, Moench, differing in having oblong-elliptic leaves, fewer ray-florets, and almost glabrous achenes. At Kew it is cultivated in the Temperate House. The handsome *Meconopsis*, from Tibet and Western China, is one of the recent introductions of Messrs. J. Veitch & Sons, who presented seeds to Kew. It is a stemless plant, and the large crimson pendulous flowers are borne on slender scapes 16–20 in. long. It is the only species at present known in which the flowers remain pendulous after expansion, and, like *M. integrifolia*, Maxim., and *M. Oliveriana*, Franch. and Prain, it has a sessile stigma. *Ribes mogollonicum*, Greene, a native of the South-Western United States, is noteworthy in having erect dense racemes of greenish flowers, followed by bluish purple berries. The material figured was obtained from a plant raised from seed received from Mr. H. Henkel, of Darmstadt, in 1900. The *Saccolabium* has been introduced from Annam by Messrs. F. Sander & Sons, and was described last year in the *Kew Bulletin*. It differs from *S. ampullaceum*, Lindl., in having a taller stem, broader subrecurved leaves, a pedunculate raceme, and much smaller sepals and petals. The Kew plant, which was received from Messrs. Sander, flowered in March, 1905.

Rubber in the East.—In the brief account of the Rubber Exhibition held in Ceylon in September, 1906, contributed by Dr. J. C. Willis to the present volume of the *Bulletin* (No. 1, p. 34), reference is made to the projected publication of a Hand-book as an official record of the exhibition. A copy of this work* has now been presented to the Library of the Royal Gardens, Kew, and the study of its contents shows that it is a valuable and reliable addition to the general literature of rubber, alike from the standpoint of the planter and of the dealer. The following extract from the preface indicates the purpose of the work :—"The dura-"tion of the exhibition allowed of its being a Rubber Congress, "lectures being given upon the various branches of the subject, "from cultivation to vulcanisation. These lectures, with the dis-"cussions following them, proved to be one of the most valuable "and most appreciated features of the exhibition. In the follow-"ing pages these lectures and discussions are given in a fully "revised form. All lectures have been fully revised by lecturers, "and have then been arranged in a logical order with the hope of "making this account a standard treatise upon the rubber industry "as it at present exists. In the same way, the lists of entries, the "prize winners, the reports of the judges, reports of the visitors, "and other matter have been incorporated, each in its proper "sequence, so that almost the whole subject is covered."

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* Peradeniya Manuals, I. Rubber in the East ; being the official account of the Ceylon Rubber Exhibition, held in the Royal Botanic Gardens, Peradeniya, in September, 1906. Edited by J. C. Willis, M. Kelway Bamber, and E. B. Denham. 8 vo. 269 pp., with illustrations, maps, and plans. Colombo. 1906.

The opening chapters relate the inception of the exhibition, and describe the buildings. In Chapters III. to X., the lectures and demonstrations and discussions are reproduced. This part of the work, pages 18–224, deals with every aspect of the rubber industry; a concluding chapter on "The work of the Ceylon Agricultural Society in connection with the Rubber Exhibition" supplies information regarding miscellaneous exhibits.

The illustrations are instructive and well reproduced; the book is clearly printed, and is provided with a satisfactory index. It is a work that should be studied by every one who is in any way interested in rubber.

J. M. H.

Fungi as Decorative Plants.—Certain kinds of fungi are sometimes used for decorative purposes, and taking into consideration the quaint forms and brilliant tints met with in many of the members of this group, it is somewhat surprising that they are not more utilised in this direction. Leaving out of consideration the numerous ephemeral kinds, commonly known as Toadstools, there are many forms that are fairly persistent, lasting for three or four weeks in an unchanged condition. Among such may be mentioned the "Candle-snuff fungus"—*Xylaria hypoxylon*—with its jet-black velvety stem and snow-white tip. The "Crimson cup"—*Dasyscypha coccinea*—resembles in form a champagne glass with a short stem. The cup varies in size from one to two inches in diameter, clear crimson inside, outside white and minutely downy. It grows on dead fallen branches during late winter and early spring, and is very abundant in some districts. Pieces of rotten wood bearing specimens of this fungus, accompanied by the bright green moss amongst which it grows, are often offered for sale in Scarborough, and it is difficult to conceive anything more beautiful than a group of this fungus in a setting of green moss arranged in a suitable shallow vessel or on the soil in a Wardian case. If the moss is kept just damp the fungi last from three to four weeks. Miss Harvey Hart of Kew has succeeded in growing this beautiful fungus from year to year by keeping the branches on which the fungus grows partly buried in moss and constantly damp. The spawn or mycelium of various other kinds of decorative fungi is also perennial in rotten wood, and might be cultivated in a similar manner, and would add much to the beauty and interest of a fern-case.

The numerous kinds of more or less woody fungi, resembling in shape a horse's hoof or an inverted bracket, that grow on the trunks of trees, make very ornamental brackets for a conservatory, and are also very durable.

G. M